HOW TO BUILD A HOTEL

BY
FRANCIS C. MOORE

PRESIDENT OF
THE CONTINENTAL INSURANCE COMPANY

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In view of the number of fires occurring, almost daily, throughout the United States, in buildings occupied as hotels, resulting, in only too many instances, in the loss of life, it would seem clearly to be the duty of everyone possessed of knowledge, no matter how acquired, as to ways and means of preventing fires, to give the benefit of that knowledge to the public, and particularly to those about to erect hotels. With this conception of duty, I have prepared the following pages. They are the result of careful study of the fires occurring in hotels throughout the past twenty years—not only those insured by my own company (themselves not few in number), but those which have occurred, whether insured or not, from Maine to California.

Not content with my own theories and investigations, I have taken the precaution to send the proof of these pages to various experts of my acquaintance—underwriters, adjusters, architects, builders, and to hotel proprietors themselves, with request for a careful revision and suggestions. Having taken such pains to secure a consensus of judgment, I present the result to those who may be interested, without diffidence, because I can claim they are not my own ideas merely; believing there are few omissions, and that those who contemplate erecting structures which are to shelter, during the night hours of the greatest danger, their fellow-beings, who will be helpless because unconscious, will do well to study and follow the advice presented. Certain considerations are of such vital importance that it would be almost sufficient to name them merely, without argument or explanation, were it not that much of the detail necessary to carry them out would be misunderstood by those owners who have not practical knowledge of construction.

F. C. M.

How to Build a Hotel.

Construction. Fire-resisting construction* for hotels involves considerations so simple that they should occur naturally to any thoughtful person. The most important of these is the prevention of air drafts which would draw flame from one story to another. Almost the earliest practical lesson learned in life in connection with fire is that combustion is accelerated by a good draft, and that fire, for want of a draft, will burn slowly, if, indeed, it does not expire, as it certainly will if deprived of oxygen, even to the extent that a closed room of small dimensions has been known to suffocate an ordinary flame. But the child, who learns to open the drafts of a stove, both in the stovepipe and at the bottom of the stove, seems to forget, in maturer years, the danger of having such drafts in the building in which he lives and sleeps as are afforded by staircase shafts, elevator shafts and the hollow spaces in the partitions and outer or enclosing walls. The dimensions of each upright flue between the studs of a partition are often greater than the square inches of throat capacity of the chimney of the house, and flame getting access to such air passages in improperly constructed buildings will go as rapidly from cellar to roof as from a fireplace through the chimney to find an exit.

* To those wishing to build fireproof hotels, a pamphlet on "How to Build Fireproof" will be sent upon application.

I, therefore, dwell first upon the importance of cutting off all communications from story to story, of whatever character, as the most important step to be taken to insure slow combustion, rapid extinction and the confinement of a fire to its floor of origin. The maximum of safety and the minimum of danger would be secured if the only passage-ways, staircases, elevators, etc., for getting from one story to another were entirely outside of building. This, of course, is not practicable, but it is entirely practicable and ought to be a provision of every building law that all communications of this character from story to story should be in a separate enclosure of brick walls, with fireproof doors at the openings, and in buildings of larger ground floor area than five thousand square feet there should be at least two such systems of staircases, one at each end of the structure. In these separate enclosures, or brick towers, the staircases, elevators, dumb-waiters, risers for electric wires, gas pipes, water pipes, &c., &c., should be carried, and especially the stand-pipes for supplying water for the extinction of fires, for the reason that the latter could be used to the last moment by firemen or by the employés of the hotel, provided the outlets for hose are near the doorways.

The inmates could escape by means of stairways so enclosed, without danger of being burned. Stone stairs or iron stairs with treads are dangerous, as they crumble if exposed to fire.

These enclosed hallways should be lighted throughout by oil lamps on bracket shelves, at a sufficient height from the floor to prevent their being knocked off by hurrying persons, so that in case the gas or electric-light should be cut off by a fire, as electric-light and gas systems nearly always are, these avenues of escape would not be darkened.

An oil lamp, with a red glass, should be displayed where it can be seen throughout the entire length of hallways to indicate the doors to the staircases. In fact, all hallways of a hotel should be lighted with oil lamps or candles by night, the lamps being so arranged as to illuminate plainly printed directions to the staircases.

I regard these suggestions as among the most important for the safety of life, and I am confident they would be so pronounced by every practical fire department chief throughout the country.

Elevator Shafts. Should be of fireproof material. Brick is best for enclosing walls. Under no circumstances should they be sheathed with wood, or with plaster on wooden lathing; and the slide guides from top to bottom of the shaft for the elevator car should be of iron; they are usually of wood, which becomes soaked with oil and the medium of rapid ascent of fire. It is quite common in hotels to sheath these shafts with yellow pine, of the most ignitible character. Such was the lining of the shaft in the Park Avenue Hotel, in which disastrous fire twenty lives were lost in February, 1902. This building was in many respects one of the best fireproof hotels in the country, having brick segmental arches in the floors. It had, however, strangely enough, elevator shafts sheathed with yellow pine; one of the upper staircases was of wood, and some of the partitions of rooms were of ordinary wood lath and plaster. If the inmates had remained in their rooms, however, they would probably have saved their lives. They sought exit through the hallways and were suffocated with smoke while trying to escape.

It may be mentioned here that few people are burned to death in fires; fortunately the gases and

smoke of combustion suffocate them before they experience the torture of being burned. If the unfortunates in this instance had shut their doors and windows, the fire department would have extinguished the fire and rescued them.

The great loss of life in the Windsor Hotel fire, of March 17, 1899, was due to the fact that the fire spread rapidly from top to bottom of the hotel because the windows on every floor of the building were open, to enable the inmates to see a procession which was passing at the time, presenting the condition of a stove with the lower and upper dampers open.

Ventilating Shafts. It is, of course, necessary in hotels to have ventilating shafts from top to bottom, especially on lines of bath-rooms and toilet-rooms. These shafts should always be thoroughly fireproof, without any woodwork whatever in them. They are too frequently, like elevator shafts, sheathed with wood or finished in wooden lath and plaster. The windows opening on these shafts from bath-rooms should be of metal sash, with wire glass, and care should be taken that nothing to start a fire is allowed near the bottom of the shaft. If the owner is not willing to go to the expense of brick or fireproof terra cotta block construction for these shafts (and he ought not to assume the care of his fellow-beings by night and day unless he is), metallic lathing, of the wire netting kind, should be used, as it is a valuable fire retardant. Plaster on wire lathing will prove more economical than wooden lathing, which latter results in cracked ceilings, owing to the fact that the wooden laths are often nailed too close together and sufficient plaster is not pushed through the interstices to "clinch" or "key" and make a good job. There

can be little cheating by the plasterer if wire lathing is used; sufficient plaster must be pushed through to get a good "clinch" on the back of the wire netting. The result is a job which lasts longer and resists fire and water sometimes for hours. While the initial cost of metallic lathing is greater than for wooden lathing, it will prove the more economical in the end, if the building should last for say ten years.

Outer Enclosing Walls. The best masonry for fire-resisting purposes is good, hard burned brick. Stone is not so safe, especially limestone, like granite, marble, etc. It is certain to disintegrate under the combined effect of fire and water, and should not be employed even for templates on which to rest the ends of beams in the brick wall; cast-iron templates should be used for this purpose.

Fire-Resisting Floors. The best floor is one of iron beams, spaced not over five feet on centres, with brick segmental arches. Next to brick for such segmental arches in reliability is burnt clay or terra cotta.

It is my opinion—but there are many who entertain a different one—that the old-fashioned brick arch is the most reliable for resisting fire; that next to this in safety stands the porous, terra cotta, segmental arch, with end construction, *i. e.*, the blocks or separate pieces placed end to end between the beams, instead of side by side in what is known as "side construction." This is said to be stronger than side construction. It is claimed by many experts that porous terra cotta is a better non-conductor than brick on account of its interior air spaces. The arch should not be less than four inches thick, having a rise of at least $1\frac{1}{4}$ inches to each foot of span between the beams, and there

should be a covering of good Portland cement and gravel concrete over this to ensure a waterproof floor. Cinder filling will burn—crushed slag from blast furnaces is better, but the Portland cement concrete should not be omitted for waterproofing purposes.

There are many patent floor arches for filling between I-beams which have great merit when properly put in, but I doubt if any of them are equal to the two I have named, and it should always be borne in mind that when employed they should be constructed with the same care with which they are prepared for tests. This is almost equally true, however, as regards brick and burnt clay arches. There is less likelihood of poor installation work, however, with brick arches or segmental arches of porous terra cotta or burnt clay. Arches should be laid in cement not lime mortar. They should not be laid in freezing weather, and where concrete is used the broken stone or gravel should be carefully washed and the cement should be of the best quality. Some of the better qualities of patent floors are the following: Fawcett, Guastavino, Rapp (which should be segmental shape—not flat), Columbian, Metropolitan, Roebling, Manhattan or Expanded Metal, etc. These floors are fully illustrated in most of the text books on construction. In all of them, I repeat, the spacing of beams should not exceed five feet.

If the building is to be throughout of fireproof construction, the roof to conform should be constructed of brick or tile, the roof beams being of iron and, where tanks are supported, of sufficient strength to carry many times the actual probable weight of the water and the containing tank itself.

Slate roofs, on very high buildings, especially on street fronts, are objectionable as, in case of fire,

the slates crack and, falling to the street, injure the firemen. A flat roof of brick-tile is better than any other.

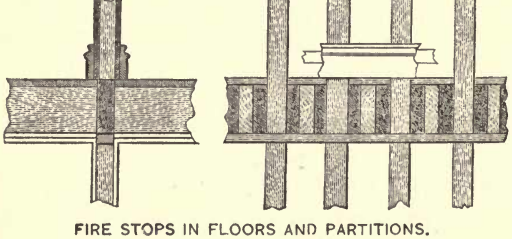
All water on roofs from rain or melting snow should be drained from the front or sides to leaders, so as to avoid drip points, from which icicles could form. Too little attention is paid to the great danger of injury to pedestrians from falling snow or icicles on high buildings. This may not be a suggestion strictly germane to this article, but it is a matter so often overlooked as to warrant its being referred to in a treatise intended to deal more or less thoroughly with the subject of fireproof buildings.

If the hotel is not of fireproof construction, a metal roof of tin is better than slate or composition. Slates are apt to crack with the heat and open up drafts. Moreover, they involve a pitched roof, which implies an empty roof space—always objectionable from a fire viewpoint. If the building, however, is fireproof the roof should be in keeping with the best methods of fireproof construction, and any cheaper construction will be shortsighted and inconsistent.

Non-Fireproof Construction. An ordinary frame building may be made to burn slowly by attention to suggestions already made as to cutting off drafts. *At every story the space between the floor beams and the upright studs, both in partitions and in the enclosing walls, should be* filled with bricks and mortar or gravel and lime mortar, care being taken not to enclose wooden beams in cement or plaster of Paris, as it will cause dry rot. Lime mortar protects wood. The filling in of partitions and side walls should be to the top of the "mop boards" or base boards. A fire getting into these

upright wooden flues, filled in this way, would not go rapidly from story to story. In most frame hotels there are thousands of well-developed flues of this character. One of the finest wooden hotels in the South, built by an owner who had no need to economize and probably did not desire to, was constructed without fire stops, the elevator shafts being lined throughout with yellow pine. As the hotel is seven stories high in places and thousands of feet long, the danger of spread of fire may be imagined.

At each story, therefore, where stud walls or partitions rest on walls or other partitions, the spaces between the floor-joists immediately under such walls and partitions, and between the sides of such joists, and to a line six inches above the top of such joists, should be filled solid or flush, with face of plastering on both sides, with bricks laid in mortar; and if such studs or partitions rest on solid timber or joists for the whole length thereof, such fillings should be placed from the top of such joists to the same height as above specified, or a strip of tin or galvanized iron at least one inch wider than the width of said studding, and continuing under the footing of such walls or partitions, may be substituted for the filling above described where there is no partition or wall under.



FIRE STOPS IN FLOORS AND PARTITIONS.

The building law of New York requires that in all furred walls the course of brick above the under

side and below the top of each tier of floor-beams shall project the thickness of the furring, more effectually to prevent the spread of fire.

A wooden building constructed in this manner, with all air-passages cut off, with metallic lathing for the ceilings, and salamander, asbestos, or other fireproof material between the floors, will resist a fire much longer than ordinary brick or stone buildings in which such simple and inexpensive but most important precautions are omitted. It will not cost much to construct a building in such a way that ample time would be secured for the escape of the inmates even if a fire should start in the night, and it is almost criminal to erect buildings for the habitation of human beings on modern fire trap principles.

Take, for instance, the simple precaution of throwing a few shovelfuls of ordinary lime mortar into the hollow spaces at the feet of ordinary "fore-and-aft" partitions, such as those which divide rooms from hallways; it would seem that a conscientious builder, even if he were not paid under his contract for taking this precaution, would not neglect it. If at every floor he should let his workmen cast in the broken bits of brick, loose mortar, and incombustible material which he afterward carts away at an expense, he would make a partition almost as fireproof as if filled in with brick from top to bottom, it being borne in mind that the danger of an ordinary partition lies, not in the fact that it is not filled in solidly with brick, or that it has an air-space, but that this air space extends from one story to another, creating a flue for a draft. This matter is more fully explained by the accompanying illustration.

Elevator shafts, as already stated, should be of brick, and if glazed doors are used they should be

glazed with wire glass; and if iron grillwork is used it should have wire glass behind it, cutting off drafts from the halls. In the New Willard Hotel, in Washington, the doors to the elevators are glazed from the top of the door to within about three feet of the floor, which enables the operator to see those waiting at landings.

Lamp closets, oil closets or waste closets should not be near the elevators, for obvious reasons, as a fire starting in them would rapidly spread through the shaft. It is not unusual to find shavings, rubbish, oily waste and other dangerous material at the bottom of elevator shafts. They should be watched carefully and kept clean.

A cheaper enclosing wall for elevators than one of brick is one made of 3-inch terra cotta or burnt clay blocks, framed with "tee" and angle iron, and plastered both sides so as to finish four inches thick.

Floors. Wooden floors should be double. "Salamander" (a fire retardent constructed of heavy strawboard covered with fireproof cement, both sides, so that it is like a piece of slate) or sheet tin or sheet iron between floors would tend to retard the passage of fire. The floors should be deafened in any case, for the comfort of inmates, and to prevent the annoyance of noises passing from one story to another. This should be done by deafening boards on cleats nailed to the beams, with lime mortar or concrete laid on the deafening boards, and an air space between the top of the deafening and the floor boards above. This would give two air spaces between the plastered ceiling of the room below and the floors of the room above.

In frame hotels the staircases should be protected in brick towers, even if no other brick is used in the building, and the ventilating shafts should be

of burnt clay blocks on "tee" or angle iron, if the owner cannot afford to construct of brick. There should be nothing whatever of a combustible character in any shaft going from floor to floor, as already stated.

Plaster Corners. These should be avoided if possible, but where unavoidable should be protected by wooden corner guards, to keep the plaster from being knocked off by moving trunks or furniture.

Chimneys, Flues, Etc. These should never be surrounded with less than eight inches of good brickwork, laid in cement. A further precaution would be to line them with tubing of cast iron or burnt clay; but a 4-inch or "half brick" flue lined with burnt clay is not so good as an 8-inch brick flue, for the reason that it is seldom faithfully constructed. The interior capacity of a flue, especially for a fireplace burning wood, which is not always dry, should be not less than eight inches by twelve. It should be carried well above the roof, and in the case of a shingle roof, well above the peak, and the flashing around the chimney should be of copper or other metal, securely cemented into the groove or joint in the brickwork for a height of at least 8 inches above the roof, and lap over the flashing below, which should extend up 7½ inches above the roof, but the lap should not be within one inch of the roof. (NOTE.—This to prevent ascent of water by capillary attraction.) Where shoulders occur in a roof, tending to lodge snow, crickets or pitch roofs should be made to slide snow beyond the chimney and prevent its piling up behind it.

The chimneys should be carried up from the ground. Above the roof black cement mortar should be used, and all smoke-flues should be surrounded with 8 inches of good brickwork, and

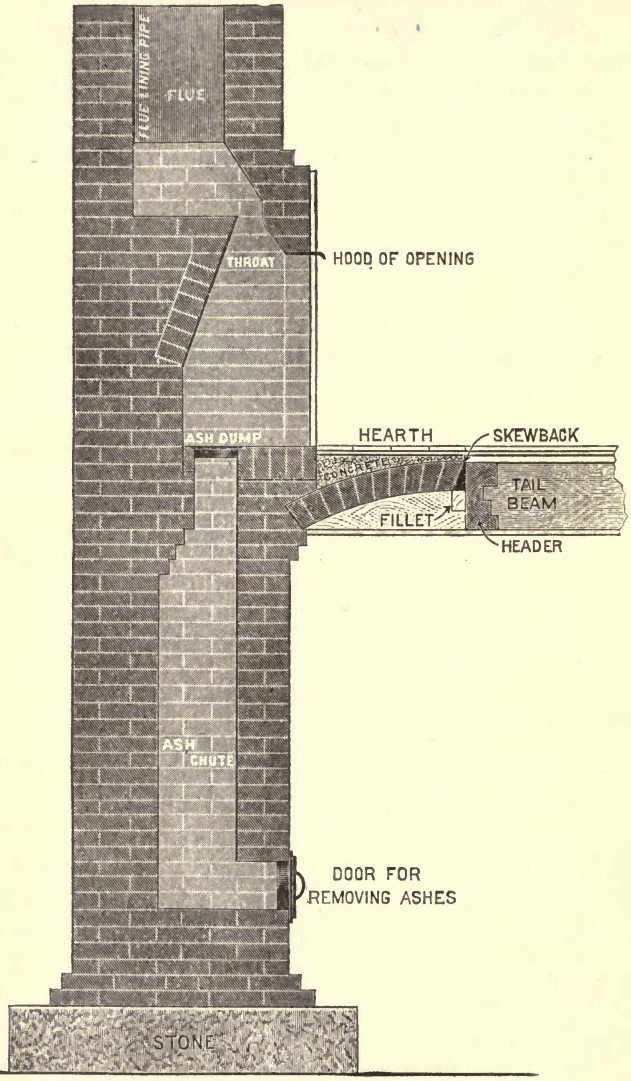
should be lined on the inside with a burnt-clay or terra-cotta flue-lining, from the bottom of the flue or from the throat of each fireplace continuously to the extreme height of the flue. The ends of such lining-pipe should fit close together, and the pipe should be built in as the flue or flues are carried up. All flues for fireplaces should be of a capacity 8″ x 12″, and the furnace and range-flues should also be 8″ x 12″ inside capacity. Vitrified drain-pipe makes good flue-lining.

All flues which are not lined should have struck joints; no parging or plastering should be allowed on the inside of any flue. All flues should be lined, however.

Fireplaces. The back of all fireplaces should be inclined toward the front, beginning six courses of brick from the floor of the hearth, as per drawings (see diagram opposite), to secure a good draft, and the fireplaces should be lined with firebrick, laid with close-rubbed joints (or with cast-iron fireplace-lining, as per design and pattern specified, if cast iron is preferred). The front opening of all fireplaces should be supported by two iron bars ½″ x 2″, 9 inches longer than the width of the opening, and should be fitted with automatic ash-dump grate.

It will also be observed in the accompanying drawing that a level shelf appears in the flue above the fireplace opening. Descending currents of air and smoke strike this shelf, rebound, and return up the chimney without puffing out into the room. It is possible, and sometimes necessary, to have a cast-iron plate resting on this shelf, so that it can be drawn forward as occasion may require, to contract the throat of the flue, the capacity of which, as already stated, should correspond somewhat with the size of the fireplace opening, to the extent

HOW TO BUILD A CHIMNEY.



SECTION OF CHIMNEY SHOWING TRIMMER ARCH UNDER HEARTH, PROPER CONSTRUCTION OF FIRE PLACE, FLUE AND FLUE LINING, ASH CHUTE, ETC.

of having an area about one-tenth or one-eleventh of the latter.

The tops of all chimneys should be capped with a 3-inch capstone, and the openings in the capstone should correspond in size with the dimension of each flue, so that no shoulder or other projection will extend over the opening.

No chimney should be enlarged where it passes the roof to form any overhanging or projection over the roof.

The chimney walls from the cellar to first floor may be carried up to form ash-pits, securely inclosed with brickwork, these to have 12″ x 16″ iron doors, with frame, in cellar, to be built in during construction.

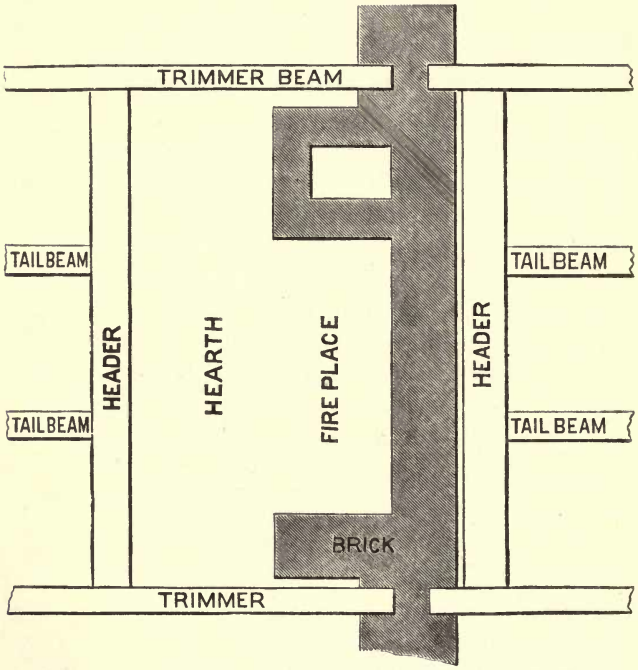
No chimney should be started or built upon any floor or beam of wood, and in no case should a chimney be corbeled out more than 8 inches from the wall, and in all cases the corbeling should consist of at least five courses of brick.*

All hearths should be constructed with trimmer arches extending 20 inches from the chimney-breast to a "skew back" or wedge-shaped piece of wood spiked to the header-beam, and the top of the arch should be filled with 2 inches of concrete to the top of finish floor. The header-beam should rest securely in stirrup-irons to be furnished by carpenter, and there should be no wooden lath or furring on the chimney-breast.

It will be observed, in the accompanying illustration, (page 18), that the trimmer-arch abuts upon a wooden skew back or wedge of wood securely spiked to the header-beam. The skew back is in turn supported by a fillet of wood spiked to the beam. This is necessary to secure a proper arch.

* This is a provision of the New York building law, and it ought not to be deviated from in any case.

If the footing of the arch comes squarely against the wooden header-beam the shrinkage of the latter will in time release the arch and allow it to fall. It is however, unfortunately the practice not only to omit this skew back, but to omit the trimmer arch



FIRE PLACE SHOWING HEADER, TRIMMER AND TAIL BEAMS.

altogether, and to support the hearth directly upon the floor-joists. This is a most dangerous construction, and a fire is only a question of time. It seems incomprehensible that an honest builder having any decent regard for safety to life would build in this way; and yet fires from this cause are frequent. In one case coming under my observation serious damage was done to a handsome dwelling, where the builder had not only constructed the hearth in this

way, but had actually swept the wooden shavings from the floors into the hollow spaces under the hearth. But for the fact that the fire was extinguished in time to discover this evidence of criminal indifference to human life, the guilt of this builder, who was no better than a would-be murderer, would never have been known. The writer cannot too earnestly urge the importance of watching the construction of chimneys, hearths, etc. It involves small expense, but important consequences.

The range should have a ventilating-flue by the side of the smoke-flue not less than 8 inches square, in addition to the smoke-flue, which should be not less than 8″ x 12″, lined with tile.

Range. The range should have a hearth projecting not less than 3 feet in front of the same and of the full width of the range, of best quality of rubbed slate, 3 inches thick (or stone or encaustic tile laid in a proper manner).

Fire Divisions. Where a frame hotel is a necessity, it should be cut up into sections not longer than 100 feet each, and the ends should be of brick, separated if possible by a space of fifty feet or more. A fireproof connecting bridgeway on the first floor will secure the convenience of one structure. The end brick or stone walls should be carried above the roof and beyond the line of rear and front walls, so as to prove a sufficient barrier to the spread of fire from one division or section to another. Iron shutters provided to the windows in the ends which expose each other would be an admirable precaution, but I presume would be regarded as an expensive feature.

Revolving Doors. A revolving fireproof door, with wire glass for a sash, in the hall opening

through walls dividing large hotels into sections, would be an admirable precaution, and preferable to an iron or tin-covered wood door, for the reason that escaping inmates could see through it and use it without leaving it open.

Laundry. The laundry, unless in a thoroughly fireproof room, should, in all cases, be outside of the building, where its burning would not expose the hotel. In any case, the dry-room should not have any woodwork about it. The usual construction, even in the best hotels, is a network of steam pipes on the floor, above which the clothes are hung, shoved in and out on movable racks. Wood continuously subjected to heat becomes so ignitible that it has been suspected of spontaneous ignition. At any rate, a garment falling upon the steam pipes below, or a match or flame touching the dry woodwork, would cause immediate combustion. Covering a wooden or plastered ceiling above, or the side walls, with sheet iron is not a sufficient protection, although if the metal were kept far enough away from the woodwork to have an air space behind it, the woodwork would probably not be ignited. Most people make the mistake of nailing metal shields to protect woodwork tightly to the woodwork itself. It should always be kept away from wood, as iron is a conductor of heat, and air is not. A space of even half an inch would tend to safety. Sheet tin is much better for this purpose than sheet iron, because of its reflecting qualities.

The laundry building should be not over one-story high, provided with a monitor skylight for ventilation and lighting purposes. A steam jet is an admirable fire-extinguishing precaution for the dry-room, and fire pails filled with water should be liberally provided.

Kitchen. This should be outside of the main structure, unless thoroughly fireproof. Care should be taken to see that the bake oven is not near woodwork of any kind. Instances have been known where wooden posts have been ignited through 20 inches of brickwork surrounding boilers and ovens. The kitchen should be of liberal size. Any experienced *Chef* will emphasize the importance of this suggestion. The vegetable bakery, the butcher shop and the pot-cleaning rooms should be separate, cut off by fireproof doors ("Underwriters" tin-covered wood pattern), with tin-covered sills. It is quite common to neglect this latter precaution.

Dining Room. This should have a high ceiling, to secure ventilation without drafts, with windows in the clear story. The best arrangement of this kind I have seen was that of the Royal Poinciana, at Palm Beach, Florida. Where a high ceiling cannot be provided, and it is necessary to open the lower windows to secure ventilation, the simple precaution of opening them from the top about half an inch all around the room would prevent complaints of drafts and keep the air of the room in proper condition. When one person complains of the heat of a room, the average waiter will usually pull down windows for a foot or more, insuring immediate and justifiable complaints from others. If the windows were opened before meals slightly from the top they would not be noticed and a rational adjustment of the matter would secure exemption from complaint.

Bath-Rooms. These need not be large, although they are more comfortable if roomy. The bath-rooms of the New Willard Hotel, at Washington, are 5 feet by 8 feet 2 inches. A marble wainscot four feet high is an admirable feature. The floor

being finished in a sort of concrete with marble chippings, rubbed to a smooth hard finish, is an economical flooring and quite as good as one of mosaic, made with cement and square marble cubes. The bath-tub in this hotel was 28 inches wide by 4 feet 9 inches long and 21 inches high above the floor, including the claw feet. An admirable feature of this bath-room was a small round stool, 13 inches in diameter, of wood stained to represent cherry, and 17½ inches high—very convenient for dressing.

The smallest bath room I ever saw was in the Hotel Cambridge, New York, being only 4 feet 7 inches wide by 6 feet 1 inch long, as per plan herewith. The bath-tub occupied the entire length, with the toilet and wash stand opposite each other, the door opening between them. This small bath-room, which is a very comfortable one notwithstanding its size, is an evidence of what may be done in hotels, the owners of which claim that bath-rooms are impracticable for want of space. Bath-rooms have grown in the estimation of the traveling public to be such necessities, to say nothing of comfort, that they should be provided in all cases and at a reasonable charge. The latest Astor Hotel projected in New York has, it is said, four hundred bath-rooms to six hundred bed-rooms.

An admirable arrangement of bath-room and closets is that of the Waldorf-Astoria, diagram herewith. This bath-room and the arrangement of the New Willard, with closets both sides, would commend themselves without elaboration.

Bath-rooms should be provided with small mirrors, 22 x 18. In the Royal Poinciana mirrors of this size are made of common pine painted with enamel white paint, with a small shelf and towel rack connected. They are a most convenient feature.

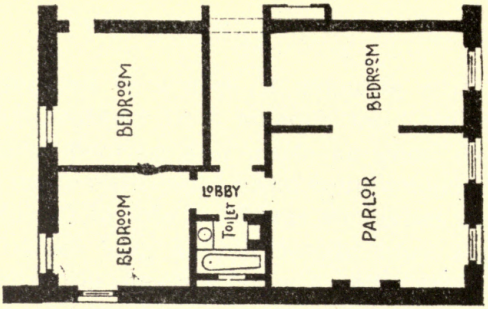
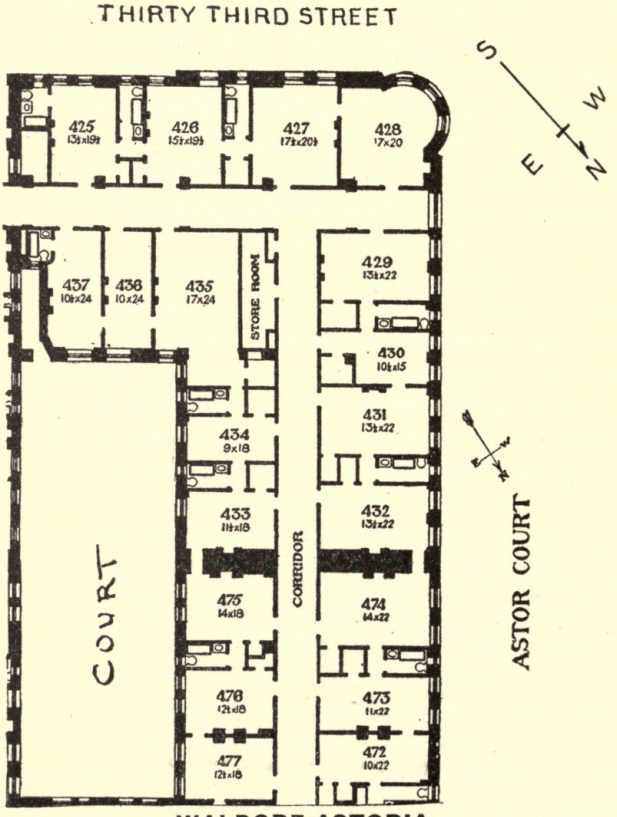


DIAGRAM OF THE CAMBRIDGE.
NEW YORK.



WALDORF-ASTORIA,
Fifth Avenue, New York.
Fourth Floor—Showing rooms and arrangement of bath-rooms and closets.

An important feature of a hotel bath-room which should never be omitted is a waterproof floor, of concrete, graded so that in case the bath-tub overflows the water will run to an ordinary pipe, inch and a quarter in diameter, passing through the wall to the outside of the building. It can have a small check or clack valve opening outwards, hung like a hinge at the exit of the pipe on the bath-room side. This would keep the cold air from coming in and exclude insects, and would admit of the escape of water, without injuring ceilings below. An elaborately frescoed ceiling in the dining-room of the Waldorf-Astoria, New York, was ruined in this way, and I have seen enough cases of injury to ceilings of hotels from this cause to enforce the wisdom of this simple and inexpensive precaution.

There should be a number of hooks in the bath-room, on the back of the door and at other points, as a convenience for hanging clothes, towels, etc. The best towel rack is a nickel-plated rod.

All bath and toilet rooms should have outside windows.

Closets. These should be liberal in size, lighted if possible by an electric light, and with shelves five feet above the floor, and hooks below the shelves. It is always a wise economy to take enough space from the bed-rooms to give liberal closets.

Windows. A storm-proof window, especially for northern exposures, is made by having the sash grooved to fit a tongue in the frame. The Waldorf-Astoria windows are built in this way. In some cases the tongue is on the sill and the groove in the bottom of the window sash; but a tongue and groove around the entire window makes a noiseless and storm-proof window.

Windows should have low sills and large panes; and a better wall space for arranging furniture is secured by putting two windows close together, instead of separating them by a pier.

Avoid French windows, *i. e.*, the kind that open like doors. They are always inconvenient.

All windows should be provided with double curtains or shades, one of green and the other of brown holland, and they should always be provided with outside blinds. If fly or mosquito screens are needed they should be of "cop bronze," which is rustless. The outside blinds should be of one piece, and not double, for convenience and economy. They should be kept in good order and should not be stuck together with paint. Painters are usually careless on this point, resulting in the slats being broken in attempts to open them.

Doors. Double doors to communications between bed-rooms are especially important, particularly in the case of bath-rooms. The locks should not be opposite each other where double doors are provided. The panels should not be less than $\frac{7}{8}$ inch thick. Double doors are necessary to prevent annoyance from loud talking and to exclude the odors of tobacco smoke.

Electric Wiring. This should be in accordance with the rules of the National Board of Fire Underwriters, which may be procured from any of the local insurance men.

Chandeliers should not hang within 6 feet 4 inches of the floor. An economical lighting of rooms where electricity is available may be secured by clusters of three light bulbs in the middle of the ceiling. This saves the cost of a chandelier and gives a better diffused light. In the ladies' writing room of the Royal Poinciana, at Palm Beach, three

clusters of five bulbs each light the room admirably, and it is a large one.

Slop Closets. These should have an outer window, and should not be in communication with toilet rooms. In some cases they are incorporated with the toilet rooms, with partitions not running to the ceiling, which is decidedly objectionable. They should not be receptacles for waste paper and rubbish, which should, in all cases, be carried immediately out of the building, where its burning would not endanger the structure. Slop closets should not be under staircases or near elevators, for the reason that they often are receptacles for waste paper, rubbish, oily waste and other fire breeders. All sweepings are dangerous. A fire occurred under the stairway in a hotel in which the writer was staying on one occasion caused by a cigarette thrown carelessly through the door, which ignited the waste paper kept in a barrel. These closets should have sash doors, with ground wire glass, so that any fire starting in them would be detected quickly; and they should be kept locked. They should be of large and convenient size, and they should contain receptacles for soiled sheets and linen.

Transoms. These should be one foot high and of dark green glass, or else covered with green holland, to keep the light of the halls from illuminating bed-rooms, to the annoyance of guests.

Music Room, Ball Room, with Stage, &c. This should be outside the main building, or underneath rooms allowed for bachelors or others who do not object to noise. In the case of the Royal Palm, at Miami, Florida, this room is outside of the main structure. Unless the music room is separated from

the main structure, there should be rigid rules as to playing pianos after 11 o'clock P. M.

Piazzas. These usually spoil the bed-rooms nearest them, because of the noise and conversations carried on by those who stay up late at night. A splendid arrangement at the Hotel Royal Palm, at Miami (see plan herewith), is to have them arranged about twenty feet from the main building, with a roof protecting them, the space between the piazzas and the main building, containing bed-rooms, &c., being utilized for shrubs, palms, etc. Where they are next to dining-rooms there is not so much objection, but they darken a dining-room, and even in such case it is better to have them separate.

One end of a piazza should be reserved where smoking is not allowed.

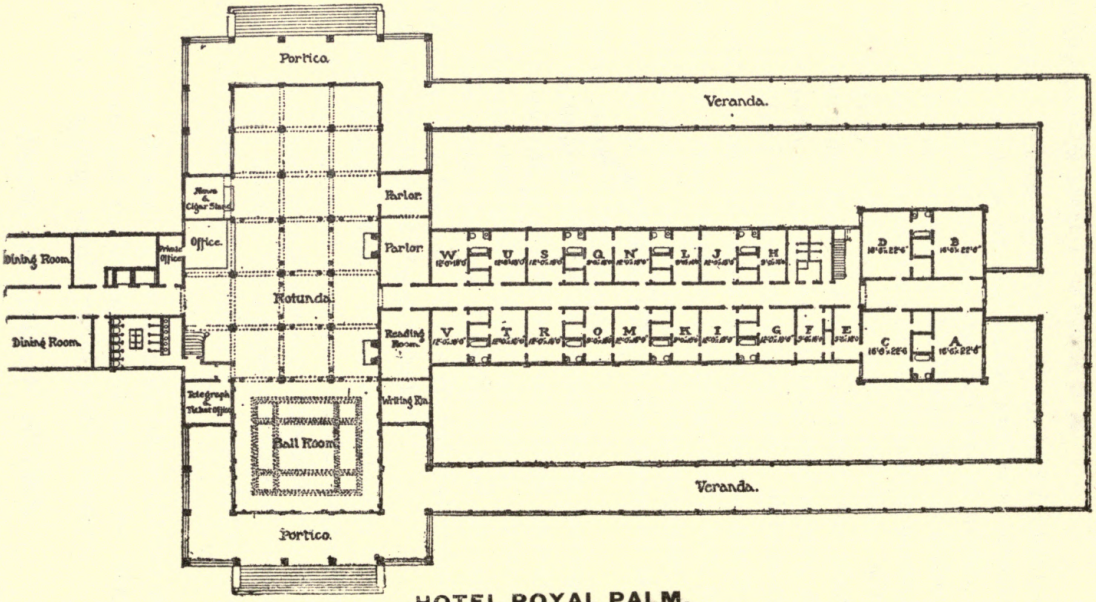
The balusters can be protected from having the paint worn off if a foot rest of 2 inch galvanized iron pipe is arranged in front of them. Otherwise they will soon become disfigured and unsightly. This pipe is a feature of the Royal Poinciana and Breakers Hotels, at Palm Beach.

Steam Risers. These if incorporated in the wall should be protected with non conducting material to prevent their heating rooms through which they pass. There should be a separate line of risers for different floors, unless they are thoroughly insulated.

Baggage Room. This should have rubber floor, unless arranged under the office, where the noise of moving baggage would not disturb sleepers.

CAUSES OF FIRES IN HOTELS.

The numerous fires in hotels are caused, in many cases, by drunken guests, who are careless with cigarettes, cigars, matches, &c.



HOTEL ROYAL PALM,
Miami, Biscayne Bay, Florida.
Showing arrangement of Verandas, Ball-Room, Etc.

By rubbish in cellars, at the foot of elevator shafts, under piazzas which are raised from the ground, often with open lattice-work, or under platforms near the entrances, with open finish, into which lighted cigarettes or cigars find easy lodgment, to ignite rubbish below.

By matches kept in drawers of bureaus, ignited by opening and closing of drawers and breaking out into fire often after careless persons have left the room. Only "safety" matches, igniting on specially prepared surfaces, should be used in hotels.

Kitchen Fires. These occur from bake ovens, boiling over of fat used for frying doughnuts, &c., &c., or from piling firewood near the ovens or ranges.

Steam-pipes, put in insecurely and not arranged with guards to keep them away from woodwork.

Electric-light Wiring. Not properly installed.

By incendiaries, who find many opportunities of setting fire to rooms for purposes of robbery.

By carelessness of women using curling irons.

By spontaneous combustion in waste closets.

By fires starting in repair rooms where old furniture is mended, glued, upholstered, &c. In one of the largest frame hotels in California I found the room for repairing old furniture on the top floor of the building where its burning would involve the whole property.

In oil and lamp rooms, which should always be outside of the main structure.

Lace and muslin curtains blowing into fireplaces or gaslights—a frequent cause of fires, especially in bed-rooms. Curtains are liable to be ignited by careless guests using matches. As I write a fire

occurs in the Herald Square Hotel in New York in this way.

ORIGIN OF HOTEL FIRES.

[*From the Boston Advertiser.*]

A hotel man tells the following in regard to hotel fires: "Whenever you hear of a hotel fire whose origin is a mystery, it is safe to attribute it to the cause I will give. The best cooking lard is the fat that is fried out of the fat part of beef. In restaurants and hotels it is put into a caldron during the day and set on the range over night. A light fire is usually kept in the range to save the trouble of starting it in the morning. During the night it may happen that an unusual draught is created by a high wind. The fire blazes up, the caldron begins to boil and the fat is in the flame. Next it is in the pot, and then follows an explosion, scattering the blazing grease in every direction. Result—a fire of mysterious origin, which destroys the building and all of its contents. I have been burned out seven times, and in every instance but one it was due to this cause."

FIRE APPLIANCES.

Every hotel should have a standpipe not less than four inches in diameter, with outlets for hose every hundred feet and if possible near a staircase, so that the hose can be used until the last moment. There should be fifty feet of hose at each outlet, and the valve should be a lever valve, opening by pulling it from the wall, so that it can be pulled only in one direction. Few persons understand handling a wheel valve, especially in the excitement attending a fire.

Fire pails, painted red, with round bottoms, arranged on a shelf with holes to fit the round bottom (which insures their not being carried off to use for other purposes), should be provided at the rate of six filled pails for every 50 running feet of hallway. They are admirable fire-extinguishing appliances, superior to all others, because anyone knows how to use them.

Axes and crowbars should be provided every hundred feet.

Watch-clocks, insuring careful work of watchmen, with stations at proper points, to ensure thorough supervision, are necessary; and large alarm bells, capable of being rung from the office as well as each floor, should be arranged for wakening guests.

Candles and candlesticks should be provided in all rooms. As already stated, electric-lights and gas are usually extinguished at an early stage of a fire.

As already suggested, lamps should be provided in the halls, on shelves at least seven feet from the floor, with red shades, located near staircases and elevators.

All fire appliances, however, no matter how thorough, important as they are, are of little value as compared with the prevention of fire. In no other class of risks can it be more truly said that an ounce of prevention is worth a pound of cure. All rooms and processes which tend to start fires, therefore, should be outside of the building. The kitchen, the bake ovens, the laundry, the waste rooms, the paint and oil rooms, the lamp-filling rooms, furniture repair and upholstering rooms, carpenter shop, &c., &c., should never be allowed where their ignition would endanger the main structure.